

18. Idaho, 10. Indiana, 22. Iowa, 6. Kansas, 21. Kentucky, 14. Maryland, 3. Missouri, 7, 8, 14, 17, 20, 21, 22. Nebraska, 30. New Mexico, 18. New York, 5, 12. Ohio, 16. Oklahoma, 17. Oregon, 10, 29. Pennsylvania, 3. Tennessee, 14. Texas, 18. Utah, 16. Washington, 21. Wisconsin, 10.

## SLEET.

The following are the dates on which sleet fell in the respective States:

Arkansas, 2. Colorado, 10, 15, 19. Connecticut, 11. Idaho, 12, 29. Indiana, 2, 3, 29. Iowa, 11, 30. Maine, 4, 15, 22. Maryland, 3, 13, 14, 28. Massachusetts, 4, 11, 12, 15, 22. Michigan, 3, 13, 29, 30. Minnesota, 9, 10, 30. Mississippi, 3. Montana, 19, 27. Nebraska, 30. New Hampshire, 10, 11, 15, 21, 22. New Jersey, 14, 15. New Mexico, 15, 20. New York, 11, 14, 15, 21. North Dakota, 10, 12. Ohio, 2, 3, 4, 10, 23, 28. Oklahoma, 25. Pennsylvania, 3, 4, 11, 14, 15. Tennessee, 1, 2, 3, 7, 13. Texas, 1. Utah, 15, 17, 22, 30. Vermont, 11, 22. Washington, 16, 30. Wisconsin, 2, 10, 12, 22. Wyoming, 15, 19.

## HUMIDITY.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England .....	76	- 2	Missouri Valley.....	73	+ 2 2
Middle Atlantic.....	77	+ 1	Northern Slope .....	68	+ 4 2
South Atlantic .....	78	+ 1	Middle Slope .....	66	+ 4 2
Florida Peninsula .....	78	- 3	Southern Slope .....	74	+ 1 8
East Gulf .....	72	- 5	Southern Plateau .....	44	- 1 2
West Gulf .....	75	+ 2	Middle Plateau .....	56	+ 2 2
Ohio Valley and Tennessee.....	76	+ 3	Northern Plateau .....	75	+ 2 2
Lower Lake .....	75	+ 3	North Pacific Coast .....	87	+ 0 0
Upper Lake .....	83	+ 3	Middle Pacific Coast .....	86	+ 1 2
North Dakota .....	79	0	South Pacific Coast .....	78	+ 1 1
Upper Mississippi .....	77	+ 3			

## WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Carson City, Nev .....	29	60	sw.	Fort Canby, Wash.....	29	56	se.
Denver, Colo .....	29	51	n.w.	Do.....	30	50	se.
Fort Canby, Wash.....	10	62	se.	Havre, Mont.....	28	53	sw.
Do.....	13	54	se.	Mount Tamalpais, Cal.	21	53	w.
Do.....	17	56	se.	Do.....	29	56	w.
Do.....	18	72	se.	New York, N. Y.....	12	56	n.w.
Do.....	20	66	se.	Winnemucca, Nev.....	29	75	w.
Do.....	27	57	se.				

## SUNSHINE AND CLOUDINESS.

The month was unusually free from clouds, except over the

Lake region, northern New England and the States of Idaho, Oregon, Washington, and northern California.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England .....	5.9	+ 0.8	Missouri Valley .....	5.4	+ 0.5
Middle Atlantic.....	4.8	- 0.4	Northern Slope .....	4.3	- 0.3
South Atlantic .....	3.9	- 0.6	Middle Slope .....	4.3	+ 1.0
Florida Peninsula .....	4.7	+ 0.1	Southern Slope .....	4.2	+ 1.0
East Gulf .....	4.6	+ 0.1	Southern Plateau .....	2.6	+ 0.3
West Gulf .....	6.0	0.0	Middle Plateau .....	4.9	+ 1.3
Ohio Valley and Tennessee.....	7.6	- 0.3	Northern Plateau .....	7.0	+ 1.0
Lower Lake .....	6.9	- 0.4	North Pacific Coast .....	8.7	+ 1.9
Upper Lake .....	4.0	- 1.3	Middle Pacific Coast .....	7.0	+ 3.0
North Dakota .....	6.8	+ 0.5	South Pacific Coast .....	5.3	+ 2.4

## ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table VII, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

**Thunderstorms.**—Reports of 661 thunderstorms were received during the current month as against 619 in 1898 and 732 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 14th, 111; 13th, 93; 21st, 61; 17th, 56.

Reports were most numerous from: Missouri, 123; Illinois, 86; Arkansas, 46; Kansas, 40.

**Auroras.**—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, 12th to 20th.

The greatest number of reports were received for the following dates: 16th, 4; 2d, 25th, 29th, 2.

Reports were most numerous from: Ohio, 5; Montana and North Dakota, 3.

**In Canada.**—Auroras were reported as follows: Father Point, 3d, 6th, 23d, 29th, 30th; Minnedosa, 4th, 6th, 30th; Swift Current, 13th, 25th, 29th; Prince Albert, 4th, 25th, 27th; Battleford, 4th.

Thunderstorms were reported as follows: Yarmouth, 12th; Bermuda, 5th.

## WEATHER IN THE WEST INDIES.

The distribution of pressure, temperature, and the direction of the resultant winds in the West Indies are shown on Chart IX. The numerical values of pressure, temperature, etc., for West Indian stations will be found in Tables I, II, III, IV, V, VI, VIII, IX, and X.

The climate and crop services of Cuba and Puerto Rico publish statistics of temperature and rainfall for a somewhat larger number of stations than is given at the end of Table II.

## DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Chief of Division of Meteorological Records.

For description of tables and charts see page 424 of REVIEW for September, 1899.

























TABLE II.—*Climatological record of voluntary and other cooperating observers—Continued.*

Stations.	Temperature. (Fahrenheit.)			Precipita- tion.		Stations.	Temperature. (Fahrenheit.)			Precipita- tion.		EXPLANATION OF SIGNS.
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.		Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.	
<i>Mexico.</i>												
Ciudad P. Diaz.....	78	40	62.2	Ins.	2.42	Pagoda.....	○	○	○	5.25	Ins.	• Extremes of temperature from observed readings of dry thermometer.
Coatzacoalcos <sup>2</sup> .....	.....	.....	75.6	.....	.....	Wallet.....	.....	.....	.....	T.	.....	• A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:
Leon de Aldamas.....	76	34	58.3	0.14	.....	Adel.....	73	-10	37.8	3.02	28.0	1 Mean of 7 a. m. + 2 p. m. + 9 p. m. + 4.
Tampico <sup>2</sup> .....	.....	.....	70.4	.....	.....	Montana.....	.....	.....	.....	.....	.....	2 Mean of 8 a. m. + 8 p. m. + 2.
Topolobampo * <sup>1</sup> .....	91	51	69.1	T.	.....	New Hampshire.....	.....	.....	.....	.....	.....	3 Mean of 7 a. m. + 7 p. m. + 2.
Vera Cruz <sup>2</sup> .....	.....	.....	75.2	.....	.....	Warner.....	.....	.....	.....	.....	.....	4 Mean of 6 a. m. + 6 p. m. + 2.
<i>New Brunswick.</i>						Carlsbad.....	.....	.....	.....	.....	.....	5 Mean of 7 a. m. + 2 p. m. + 2.
St. John .....	59	17	34.6	4.53	12.3	Mesilla Park.....	90	.....	.....	.....	.....	6 Mean of readings at various hours reduced to true daily mean by special tables.
<i>Late reports for October, 1899.</i>						North Carolina.....	.....	.....	.....	.....	.....	7 Mean from hourly readings of thermograph.
<i>California.</i>						Selma.....	85 <sup>1</sup>	35 <sup>1</sup>	61.4 <sup>1</sup>	4.90	.....	8 Mean of sunrise and noon.
Azusa.....	.....	.....	.....	.....	.....	Bement.....	.....	.....	.....	.....	.....	9 Mean of sunrise, noon, sunset, and midnight.
Claremont.....	94	36	60.0	3.68	.....	Bladensburg.....	88	22	54.4	2.23	.....	The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.
Glendora.....	.....	.....	.....	1.64	.....	Granville.....	86	23	56.7	1.94	.....	An italic letter following the name of a station, as "Livingston a," "Livingston b," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "1" denotes 14 days missing.
Hydesville.....	.....	.....	.....	1.94	.....	Logan.....	.....	.....	.....	2.87	.....	No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.
Lakeside.....	.....	.....	.....	4.95	.....	Youngstown.....	.....	.....	.....	1.72	.....	
Placerville.....	86	30	52.2	7.73	.....	Oregon.....	.....	.....	.....	.....	.....	
San Miguel Island.....	88	48	61.0	1.40	.....	Tillamook Rock.....	.....	.....	.....	4.32	.....	
Santa Paula.....	101	44	67.0	1.84	.....	Texas.....	.....	.....	.....	.....	.....	
Yuba City * <sup>6</sup> .....	94	44	62.6	4.42	.....	Anson.....	.....	.....	.....	3.00	CORRECTION.	
						San Antonio.....	97	46	74.2	1.42	.....	The following changes have been made in the names of stations:
						Mexico.....	.....	.....	.....	.....	.....	New Mexico, Eddy, changed to Carlsbad.
						Topolobampo * <sup>1</sup> .....	94	63	76.2	0.57	.....	

















TABLE XI.—*Data furnished by the Canadian Meteorological Service, November, 1899.*

Stations.	Pressure.			Temperature.			Precipitation.			Stations.	Pressure.			Temperature.			Precipitation.			
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean max. min.	Mean.	Departure from normal.	Total.		Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Mean max. min.	Mean.	Total.	Departure from normal.	Depth of snow.	
St. Johns, N. F.....	In.	In.	In.	o	o	o	In.	In.	In.	Parry Sound, Ont ...	In.	In.	In.	o	o	o	In.	In.	In.	
Sydney, C. B. I.....	29.53	29.73	- .21	36.4	- 0.1	40.6	32.1	3.74	... .74	29.35	30.06	+ .04	37.2	+ 5.1	44.4	30.1	1.40	- 2.81 6.8		
Halifax, N. S.....	29.82	29.86	- .10	38.1	+ 1.0	48.8	32.4	4.82	- 0.79	1.0	29.29	30.00	- .02	36.7	+ 12.7	44.1	29.8	1.34	- 0.64	
Grand Manan, N. B.....	29.81	29.92	- .08	39.0	+ 1.7	46.1	31.8	4.58	- 0.64	1.3	29.12	29.98	- .10	34.7	+ 16.7	42.9	26.5	0.55	- 0.44 2.5	
Yarmouth, N. S.....	29.90	29.95	- .08	38.1	- 0.8	43.7	32.5	3.94	- 0.89	5.3	29.12	29.98	- .07	34.4	+ 17.1	44.9	28.9	1.11	+ 0.31 5.6	
Charlottet' n. P. E. I.....	29.85	29.89	- .13	36.4	+ 0.9	41.8	31.0	3.87	+ 0.14	11.3	27.63	29.93	- .12	35.5	+ 16.7	44.4	26.6	0.90	- 0.30 0.6	
Chatham, N. B.....	29.92	29.94	- .05	31.5	+ 0.5	38.6	24.4	3.55	+ 0.13	9.1	Medicine Hat, Assin.	.....	.....	.....	.....	.....	.....	.....	.....	.....
Father Point, Que.....	29.94	29.96	- .01	29.2	+ 0.3	35.5	23.0	2.01	- 0.45	10.3	Swift Current, Assin.	27.82	29.92	- .14	39.8	+ 16.6	49.2	30.4	0.59	+ 0.08 0.1
Quebec, Que.....	29.67	30.01	.00	31.1	+ 2.1	35.6	26.5	2.42	- 1.60	0.8	Calgary, Alberta .....	26.23	29.80	- .25	37.1	+ 11.8	47.0	27.1	0.26	- 0.09 2.2
Montreal, Que.....	29.80	30.03	.00	38.9	+ 2.1	38.8	29.0	1.84	- 1.33	2.4	Banff, Alberta .....	25.22	29.92	.....	35.7	.....	41.9	29.5	1.26	..... 6.6
Bissett, Ont.....	29.45	30.08	+ .08	31.9	+ 3.3	39.3	24.6	1.65	- 1.00	8.2	Edmonton, Alberta .....	27.46	29.82	- .22	32.4	+ 9.5	40.8	23.9	0.04	- 0.18 0.4
Ottawa, Ont.....	29.68	30.01	.....	33.7	+ 2.0	38.9	28.4	1.74	.....	T.	Prince Albert, Sask.....	28.27	29.86	.....	30.3	+ 14.9	38.9	21.8	1.16	..... 8.0
Kingston, Ont.....	29.73	30.05	+ .01	38.0	+ 3.0	44.8	31.9	1.82	- 2.10	0.8	Battleford, Sask.....	28.10	29.88	.....	33.6	+ 19.9	42.6	24.6	0.70	..... 1.0
Toronto, Ont.....	29.68	30.07	+ .02	40.7	+ 5.1	47.0	34.5	1.08	- 1.92	0.7	Kamloops, B. C.....	28.59	29.88	.....	46.0	.....	51.0	41.0	0.86	.....
White River, Ont.....	29.68	30.07	+ .02	31.8	+ 11.8	38.6	25.1	0.70	- 1.19	1.7	Victoria, B. C .....	29.71	.....	.....	50.2	.....	58.7	46.7	6.43	.....
Port Stanley, Ont .....	29.41	30.06	+ .02	40.8	+ 4.0	47.0	34.6	2.20	- 0.95	T.	Barkerville, N. W. T.....	25.40	29.75	.....	35.1	.....	40.9	29.3	2.06	..... 12.4
Saugeen, Ont.....	29.34	30.07	+ .05	39.7	+ 4.7	45.4	34.1	1.07	- 2.83	1.6	Hamilton, Bermuda.....	29.85	30.01	- .01	67.4	- 1.8	71.7	63.1	5.17	.....

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